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TOPICAL TREATMENT OF VARIOUS SKIN INFECTIONS WITH AN ANTIBIOTIC POLYMYXIN B-BACITRACIN-NEOMYCIN OINTMENT*

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THIS INVESTIGATION deals with the topical therapy of various skin infections by the application of a combined antibiotic ointment containing the following three antibiotics: polymyxin B, bacitracin and neomycin.

Polymyxin B, which is obtained from *Bacillus polymyxa (Bacillus aerosporus,* Greer), is a stable polypeptide with a strong bactericidal action on Gram-negative bacilli and especially on *Pseudomonas æruginosa.*[1] *Pseudomonas æruginosa* is a skin saprophyte which can, at times, cause an infectious dermatitis resistant to ordinary therapy and is even capable of producing septicæmia and death.[2] Aerosporin (Polymyxin B) has been shown to be the specific therapy for such infections.[3]

Bacitracin, isolated by Meleney *et al.* in 1943, is obtained from a strain of *B. subtilis.* It has a particularly strong bactericidal action *in vitro* on strains of hæmolytic and nonhæmolytic streptococci, coagulase-positive staphylococci, anaerobic cocci, oral spirochætes, and many others. Gram-positive organisms are usually inhibited by concentrations of 0.001 to 0.5 unit per c.c. *Neomycin* was discovered by Waksman and Lechevalier in 1949. It is obtained from *Streptomyces fradiæ.* It is a broad-spectrum antibiotic recognized as highly effective against *Proteus vulgaris* and infections due to *Micrococcus pyogenes* (*Staphylococcus albus* and *aureus*).

The ointment base is a special low-melting petrolatum. Forbes[4] has shown that results are obtained more rapidly when the antibiotic is incorporated in a petrolatum base than when a water-miscible base is employed.

It is preferable to use a specific antibiotic for each infection if the organism can be identified and its antibiotic sensitivity determined. This, however, is not always practical and in certain cases of surface infection would involve needless expense to the patient. The synergism of antibiotics has been investigated during the past several years, and combinations have been found to give better results than the use of a single antibiotic. The ointment described above was used in the treatment of 61 patients with primary and secondary skin infections. Table I gives the diagnosis, duration of treatment and result in each case.

Results are generally quick and excellent, especially in primary infectious diseases. In secondarily infected dermatitis, the antibiotic ointment clears the infection, but it obviously does not cure primary conditions such as acne or eczema. For that reason, it is preferable to combine it with a sulphur ointment for cases of acne, and with a hydrocortisone ointment when there is eczema.

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The preparation used on these cases was Neosporin brand ointment, supplied with the compliments of Burroughs Wellcome & Co. (Canada) Limited through Mr. Jean Guy Asselin.

TABLE I.

Diagnosis	*Days treated*	*Result*
Infected acne	13	Excellent
Pustular superficial acne	14	Fair
Infected acne	10	Fair
Infected acne	12	Excellent
Infected acne	8	Fair
Infected acne	11	Fair
Infected acne	14	Excellent
Infected acne	10	Excellent
Balanitis	5	Excellent
Balanitis	3	Excellent
Balanitis	5	Fair
Infected eczematous dermatitis	5	Excellent
Infected atopic dermatitis	5	Excellent
Impetiginous atopic dermatitis	14	Excellent
Generalized atopic dermatitis, secondary infection	12	Excellent
Infected eczema	12	Fair
Infected eczema	7	Excellent
Secondarily infected contact dermatitis	15	Fair
Secondarily infected contact dermatitis	11	Excellent
Secondarily infected contact dermatitis	30	None
Secondarily infected contact dermatitis	7	Poor
Secondarily infected contact dermatitis	2	Excellent
Secondarily infected contact dermatitis	15	None
Infected contact dermatitis and pyoderma	7	Excellent
Bacterial eczema	12	None
Bacterial dermatitis	30	Excellent
Seborrhœic dermatitis	6	None
Epidermophytosis and secondary infection	10	Fair
Nuchal folliculitis	10	Fair
Folliculitis	3	Excellent
Folliculitis	5	Excellent
Folliculitis (Dühring)	24	Excellent
Superficial folliculitis	7	Excellent
Acuminate folliculitis	7	Excellent
Folliculitis and intertrigo	12	Excellent
Folliculitis and intertrigo	5	Excellent
Folliculitis	1	Excellent
Furunculosis and folliculitis	22	None
Furunculosis	7	None
Herpes (profuse)	6	Fair
Herpes simplex	3	Fair
Herpes simplex	1	Excellent
Herpes simplex	2	Excellent
Streptococcal impetigo	10	Fair
Streptococcal and staphylococcal impetigo	8	Fair
Streptococcal impetigo	8	Excellent
Impetigo bullosa	3	Excellent
Impetigo bullosa	4	Excellent
Streptococcus infection	12	Excellent
Intertrigo	10	None
Intertrigo	2	Excellent
Intertrigo	30	None
Intertrigo and infection associated with eczema	5	Excellent
Infection and intertrigo (Stevens-Johnson)	2	Excellent
Intertrigo (ear)	2	Excellent
Infected wounds	7	Excellent
Perlèche (Angular stomatitis)	12	None
Pyoderma of both hands	7	Excellent
Deep sycosis	20	Fair
Sycosis (malar and nuchal)	7	Excellent
Zona ophthalmica	7	Excellent

In herpes simplex, the lesions were found to clear more quickly, as had already been observed by Pass and Rattner.[5]

In some severe conditions, such as Dühring's disease, Stevens-Johnson syndrome and zona ophthalmica, systemic therapy was required, but the antibiotic ointment proved a valuable addition to the treatment.

In one patient with contact dermatitis due to cement, the vesicular and weeping lesions increased. Unfortunately, no tests were made to establish to which product the patient was sensitive.

Sensitization by Neosporin ointment seldom occurs, because both polymyxin B and neomycin have an extremely low index of allergenicity,[6, 7] while that of bacitracin, though higher (0.5 to 1%), remains considerably below that of most other antibiotics.[8]

Penicillin is a very valuable drug, but the incidence of sensitization to it is 5 to 10%. Even when used topically it can produce a general sensitization which may result in severe systemic reactions if the drug is subsequently administered orally or parenterally. The same is true for aureomycin and dihydrostreptomycin. Since the three antibiotics present in Neosporin ointment are less frequently used systemically, their topical use is safe and avoids possible sensitization of the patient to penicillin, streptomycin or the broad-spectrum antibiotics should their systemic use become necessary.

CONCLUSION

In a series of 61 patients with skin infections there were 60.7% excellent, 20.9% fair, and 1.6% poor responses and 14.8% failed to respond. Primary infections, especially those due to streptococci, clear rapidly. In certain deep-seated infections, systemic therapy is preferable. In addition, this preparation very rarely produces sensitization.

This ointment was also used prophylactically after skin surgery and electrocoagulation of nævi, warts and epithelioma. In the ten cases there was not a single instance of secondary infection.

We wish to express our appreciation to Mr. Jean Guy Asselin of Burroughs Wellcome & Co. (Canada) Limited, and to Miss Claire Champigny, R.N., for their generous and unfailing co-operation.

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SUBUNGUAL HÆMATOMA

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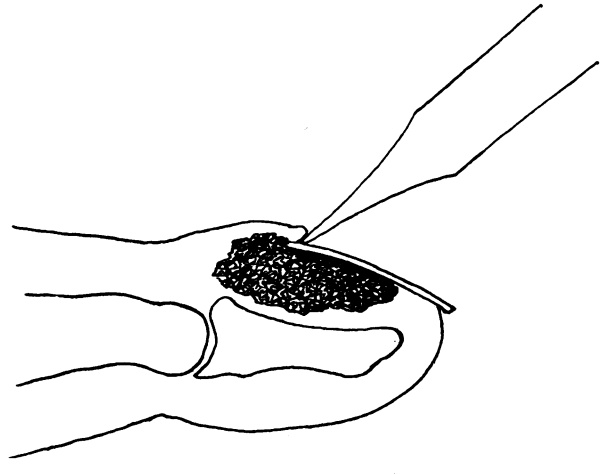
THE PURPOSE of this communication is to describe a simple method of opening and draining the painful and extensive subungual hæmatoma. Various procedures have been used to open this lesion, namely, drilling the nail with a dental burr or the point of a knife, puncturing it with a hot needle, or avulsing it.

When the injury to the end of the digit has been severe enough to rupture the cuticle, any collection of blood under the nail drains away spontaneously. If this rupturing does not occur, the effusion separates the nail from the hyponychium; hence it is possible to enter the hæmatoma by separating the cuticle back from the base of the nail.

METHOD

The area is painted with an antiseptic solution. A toothpick, a von Graefe knife, or a wooden applicator which has been "flattened" with a knife is used to push back the cuticle.



The end of the toothpick or applicator can be sterilized by soaking in iodine solution. Soaking the finger or toe in warm water and then applying any ointment will soften the cuticle. No anæsthetic is necessary. Excessive pressure or haste is to be avoided. The most convenient site of the nail fold is selected, either the centre or to the side, depending on the location of the hæmatoma.

When the blood has been evacuated the pain is immediately relieved and the opening can be readily enlarged by further lifting the cuticle away from the nail. A sterile dressing is applied to absorb any further drainage.

I am indebted to Dr. H. M. Edmison for the drawing.

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